

CLAIMS:

1. A method of processing a time-sequence of separate image data sets each set comprising a plurality of image data items which each represent the location of an image pixel of the image subject according to a spatially fixed reference frame within which the subject is located, the method including the steps of:

(a) selecting a plurality of separate image pixel locations within said reference frame;

(b) selecting from each of a plurality of said separate image data sets those image data items which represent image pixels located at said plurality of separate image pixel locations;

(c) generating a time-domain image according to said selected image data items wherein those image pixels of the time-domain image sharing a common image pixel location within said reference frame are arranged in said time-sequence in a line containing only those pixels.

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2. A method according to Claim 1 wherein each image pixel is an image voxel such that each image data item represents the location of an image voxel of the image subject according to a spatially fixed three-dimensional reference frame wherein each image data set contains

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image data items representing image voxel locations  
spanning all three dimensions of said reference frame.

3. A method according to any preceding claim wherein  
5 the selection of said plurality of image pixel locations  
at step (a) comprises selecting a target image pixel  
location within said reference frame and subsequently  
selecting all image pixel locations which are intersected  
by a predefined first locus intersecting said target  
10 image pixel location.

4. A method according to Claim 3 wherein said  
predefined first locus is a line extending through said  
reference frame.  
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5. A method according to Claim 4 wherein said line  
extends through only one dimension of said reference  
frame and intersects all pixel locations within a column  
or a row of pixel locations within the reference frame.  
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6. A method according to any of preceding claims 3 to 5  
wherein said time-domain image is generated such that  
those image pixels of the time-domain image which are  
represented by image data items selected from a common  
25 image data set are arranged in a line containing only  
those pixels.

7. A method according to Claim 6 in which said time-domain image comprises a matrix of pixels arranged to define columns and rows, wherein each column contains  
5 only those image pixels sharing a common pixel location within said reference frame, and each row contains only those image pixels selected from a common image data set or vice versa.

10 8. A method according to any of preceding claims 3 to 7 including: selecting a target one of said plurality of separate image data sets and selecting therefrom those image data items which represent image pixels located in a common first plane containing said first locus;  
15 generating a first spatial-domain image according to the data items so selected; and, generating a composite image containing said first spatial-domain image and said time-domain image aligned such that those pixels of the first spatial-domain image and of the time-domain image which  
20 share a common image pixel location within said reference frame are arranged in-line.

9. A method according to Claim 8 in which said composite image contains a second time-domain image  
25 generated according to any one of claims 3 to 7 in respect of a second predefined locus which intersects

said first locus at said target image pixel location selected at step (a), and is substantially coplanar with said first locus, wherein said first spatial-domain image and said second time-domain image are aligned such that  
5 those pixels of the first spatial-domain image and of the second time-domain image which share a common image pixel location within said reference frame are arranged in-line.

10 10. A method according to Claim 9 wherein said first predefined locus is a line and said second predefined locus is a line substantially perpendicular to said first predefined locus.

15 11. A method according to any of claims 8 to 10 including: selecting from said target one of said plurality of separate image data sets those data items which represent image pixels located in a common second plane being non-coplanar with said first plane and  
20 containing said first locus; generating a second spatial domain image according to the data items so selected; and, generating said composite image so as to contain said second spatial-domain image aligned such that those pixels of the second spatial-domain image and of said  
25 time-domain image which share a common pixel location within said reference frame are arranged in-line.

12. A method according to any one of preceding  
claims 8 to 11 including: selecting from said target one  
of said plurality of separate image data sets those data  
5 items which represent image pixels located in a common  
third plane being non-coplanar with said first plane and  
containing said second locus; generating a third spatial  
domain image according to the data items so selected;  
and, generating said composite image so as to contain  
10 said third spatial-domain image aligned such that those  
pixels of the third spatial-domain image and of said  
second time-domain image which share a common pixel  
location within said reference frame are arranged in-  
line.

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13. A method according to Claim 12 in which said  
composite image contains a third time-domain image  
generated according to any one of claims 3 to 7 in  
respect of a third predefined locus which intersects said  
20 first locus and said second locus at said target image  
pixel location and is contained within one of said second  
plane and said third plane, wherein said third time-  
domain image and one of said second and said third  
spatial-domain images respectively are aligned such that  
25 those pixels of the third time-domain image and those  
pixels of said one of said second and said third spatial-

domain images which share a common image pixel location within said reference frame are arranged in-line.

14. A method according to claim 12 or 13 wherein  
5 said first, second and third planes are all mutually substantially perpendicular.

15. Apparatus for processing a time-sequence of separate image data sets each set comprising a plurality  
10 of image data items which each represent the location of an image pixel of the image subject according to a spatially fixed reference frame within which the subject is located, the method including the steps of:

(a) first selection means selecting a plurality of  
15 separate image pixel locations within said reference frame;

(b) second selection means for selecting from each of a plurality of said separate image data sets those image data items which represent image pixels located at  
20 said plurality of separate image pixel locations;

(c) image generating means for generating a time-domain image according to said selected image data items wherein those image pixels of the time-domain image sharing a common image pixel location within said  
25 reference frame are arranged in said time-sequence in a line containing only those pixels.

16. Apparatus according to Claim 15 wherein each image pixel is an image voxel such that each image data item represent the location of an image voxel of the image subject according to a spatially fixed three-dimensional reference frame wherein each image data set contains image data items representing image voxel locations spanning all three dimensions of said reference frame.

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17. Apparatus according to any of preceding claims 15 and 16 wherein the first selection means is arranged to select a target image pixel location within said reference frame, and includes locus means for defining a first locus intersecting said target image pixel location, wherein the first selection means is arranged to select all image pixel locations which are intersected by said first locus.

20 18. Apparatus according to Claim 17 wherein said predefined first locus is a line extending through said reference frame.

19. Apparatus according to Claim 18 wherein said

line extends through only one dimension of said reference frame and intersects all pixel locations within a column or a row of pixel locations within the reference frame.

5        20.        Apparatus according to any of preceding claims  
17 to 19 wherein said image generating means is arranged  
to generate said time-domain image such that those image  
pixels of the time-domain image which are represented by  
image data items selected from a common image data set  
10 are arranged in a line containing only those pixels.

21.        Apparatus according to Claim 20 in which said  
image generating means is arranged to generate said time-  
domain image comprising a matrix of pixels arranged to  
15 define columns and rows, wherein each column contains  
only those image pixels sharing a common pixel location  
within said reference frame, and each row contains only  
those image pixels selected from a common image data set,  
or vice versa.

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22.        Apparatus according to any of preceding claims  
17 to 21 wherein said selection means is arranged to  
select from a target one of said plurality of separate  
image data sets those image data items which represent  
25 image pixels located in a common first plane containing  
said first locus; wherein the image generating means is



arranged to generate a first spatial-domain image according to the data items so selected and, to generate a composite image containing said first spatial-domain image and said time-domain image aligned such that those  
5 pixels of the first spatial-domain image and of the time-domain image which share a common image pixel location within said reference frame are arranged in-line.

23. Apparatus according to Claim 22 wherein: said  
10 locus means is arranged to define a second locus which intersects said first locus at said target image pixel location and is substantially coplanar with said first locus; said second selection means is arranged to select all image data items the pixel locations of which are  
15 intersected by said second locus; said image generation means is arranged to generate a second time-domain image according to image data items so selected and to generate a composite image which contains a second time-domain image in which said first spatial-domain image and said  
20 second time-domain image are aligned such that those pixels of the first spatial-domain image and of the second time-domain image which share a common image pixel location within said reference frame are arranged in-line.

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24. Apparatus according to Claim 23 wherein said

Locus means is arranged to define said first locus as a line and said second locus is a line substantially perpendicular to said first locus.

5        25.        Apparatus according to any of claims 22 to 24  
Wherein: said second selection means is arranged to  
select from said target one of said plurality of separate  
image data sets those data items which represent image  
pixels located in a common second plane being non-  
10 coplanar with said first plane and containing said first  
locus; said image generating means is arranged to  
generate a second spatial-domain image according to the  
data items so selected, and to generate said composite  
image so as to contain said second spatial-domain image  
15 aligned such that those pixels of the second spatial-  
domain image and of said time-domain image which share a  
common pixel location within said reference frame are  
arranged in-line.

20        26.        Apparatus according to any one of preceding  
claims 22 to 25 wherein: said second selection means is  
arranged to select from said target one of said plurality  
of separate image data sets those data items which  
represent image pixels located in a common third plane  
25 being non-coplanar with said first plane and containing  
said second locus; and said image generating means is

arranged to generate a third spatial domain image according to the data items so selected, and to generate said composite image so as to contain said third spatial-domain image aligned such that those pixels of the third spatial-domain image and of said second time-domain image which share a common pixel location within said reference frame are arranged in-line.

27. Apparatus according to Claim 26 wherein: said locus means is arranged to define a third locus which intersects said first locus and said second locus at said target image pixel location and is contained within one of said second plane and said third planes; said second selection means is arranged to select all image data items the pixel locations of which are intersected by said third locus; said image generation means is arranged to generate a third time-domain image according to image data items so selected and to generate a composite image which contains said third time-domain image, wherein said third time-domain image and one of said second and said third spatial-domain images respectively are aligned such that those pixels of the third time-domain image and those pixels of said one of said second and said third spatial-domain images which share a common image pixel location within said reference frame are arranged in-line.

28. Apparatus according to claim 26 or 27 wherein  
said second selection means is arranged to select said  
first, second and third planes to be mutually  
5 substantially perpendicular.

29. Apparatus according to any one of preceding  
claims 15 to 27 comprising computer means programmed to  
perform the method according to any one of claims 1 to  
10 13.

30. Computer means programmed to perform the method  
according to any one of claims 1 to 14.

15 31. A computer program product containing a  
computer program for performing the method according to  
any one of claims 1 to 14.

32. A computer program for performing the method  
20 according to any one of claims 1 to 14.

33. An image generated according to the method of  
any one of claims 1 to 14.

25 34. A method substantially as described in any one

embodiment hereinbefore with reference to the  
accompanying drawings.

35. Apparatus substantially as described in any one  
5 embodiment hereinbefore with reference to the  
accompanying drawings.